

Abstract

An electronically insulating proton conductor (C) is adhered or deposited as a film on a dense phase proton permeable material (D) in a thickness such that the composite C/D has a proton conductivity in a preferred intermediate temperature range of 175-550°C. The composite C/D is incorporated in a high temperature electrolyte membrane electrolyte assembly (MEA), which is incorporated into a fuel cell that can operate in this intermediate temperature range. The fuel cell in turn is incorporated into a fuel cell system having a fuel reformer in the flow field of a fuel mixture entering the fuel cell or in a mode where the fuel cell receives fuel from an external reformer.